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TAXONOMIC COLLECTIONS AND PROCESS OF IDENTIFICATION

TAXONOMIC PROCEDURE

1. The selection of a suitale problem

That the choice of research topic is of great importance, even the researcher no loose his time and effort to the study group does not represent a real problem ; Here are some important considerations for the selection of research topic :-

1. Must be in the range enough to be completed within a reasonable period
2. Must be one of the most common groups are easy to get the samples
3. Group must be easy to study in the field

*2.*Collect the samples and take care of it

That the most important problems facing researchers in taxonomic studies is to get the samples , you may be a few in some seasons, or non-existent

4.2 Collection and Preservation of insects

I. Collection

1. Hand picking

This method is suitable for large insects like beetles and grasshoppers. It is a tedious method. It is unsuitable for insects inflicting painful bites and stings.

2. Insect net: There are two types of insect nets.

i. Aerial net: (Butterfly net) It is useful for catching active fliers like moths, butterflies, dragonflies, flies, wasps, etc. The net consists of three parts viz., hoop, handle and porous cloth bag made out of mosquito netting material. It has a small hoop (30-40 cm dia) and a long handle (100 cm).

ii. Sweep net: This is heavier than the aerial net. It consists of a short handle, a large hoop and a muslin cloth bag. This is suitable for collecting leafhoppers, grasshoppers and other small insects. The net is swept over vegetation and quickly turned to fold the cloth bag over the hoop in order to prevent the escape of trapped insects.

3. Aspirator (Pooter)

It is a device useful to collect small insects into a vial with no damage to the specimens. It is also useful for collecting insects from the insect net or any other surface.

Fig . Aspirator

4. Traps: are an easy & often very effective method of collecting, many types of insects & it is any device containing something to which the insects are attached & so arranged. There are many types of traps

Food lure trap	-	Flies
Sex lure trap	-	Moths
Water trap	-	Brown plant hopper
Sticky trap	-	Whiteflies
Suction trap	-	Whiteflies

5. Berlese funnel

Soil dwelling insects can be collected by using Berlese funnel.

Light trap	-	Positively phototropic insects


Fig. a.Sticky trap b. Light trap


A B

Fig. A and B Bait traps

II. KILLING

Killing should be done immediately after capture. Potassium cyanide, ethyl acetate, carbon tetra chloride (carbona) and chloroform are commonly used for killing insects. Potassium cyanide kills the insect quickly but rigor mortis sets in quickly. Ethyl acetate kills the insects more slowly and does not last long. But the dead insects remain in a relaxed condition for a longer time without becoming brittle.

ii. Pinching the thorax

A butterfly or moth can be immobilised and killed in an emergency by giving a sharp pinch on the thorax.

iii. Killing with alcohol

Many insects can be killed by dropping them directly into 70 to 90% ethyl or isopropyl alcohol.

III. PRESERVATION

i. Materials required

1. Paper folds (Paper envelopes): They are useful for temporary preservation and storage of large winged insects such as dragonfiles, butterflies or moths. These triangular envelopes can be made from a sheet of notebook or by using absorbent type of paper used in duplicating machines. Cut the paper into rectangles with their sides in the proportion of 3:5. Bring the diagonally opposite corners together to leave two projecting flaps. Write the data regarding collection on the outer side of a projecting flap. Keep the immobilised insect in between the two overlapping triangles. Fold the flaps to produce a triangular envelope.

2. Setting board (Spreading board): It is useful for spreading the wings of dead insects. It is a wooden board with a central groove in the middle. Flat cork strips are glued on either side of the groove and in the bottom of the groove to enable pinning. A thermocole sheet with a centrally cut groove can also be used as a substitute for the setting board.

3. Relaxing container: Setting or mounting an insect should be done within a day after killing. Otherwise the insect will become stiff and brittle. Stiffness in the dead insect can be removed by placing it in a relaxing container. High humidity inside the relaxing container permits water to be reintroduced into the specimens thus making them flexible. Fill a container with sand to 1/4th of its capacity. Saturate the sand with water. Add a few drops of carbolic acid or formaldehyde to prevent mould growth. Keep the dried specimens in a small open box or in an uncovered petri dish to avoid direct contact of the specimen with moist sand. Close the lid tightly and allow them to remain for a day or two until they become flexible.

4. Pins: Common pins are undesirable for pinning insects. Pins used for pinning insects should be slender, hard with a pointed tip and a small head. Pure nickel pins or nickel plated ones resist rusting. Commonly No.16 and 20 pins are used for pinning larger and smaller insects respectively.

5. Micropins: For pinning very small insects micropins are used. They are very thin, slender, delicate and headless pins. They do not rust. They are also known as insect pins minuten pins or entomological pins.

ii. Methods of preservation

1. Pinning

It is the best and most common method to preserve hard bodied insects. They will dry and remain in perfect condition on the pins without requiring any further treatment. During drying the outer exoskeleton remains intact while the inner soft tissues dry up.

Insects can be pinned directly if they are big. They are pinned vertically through their body. During pinning the insect is held between the thumb and forefinger of one hand and the pin is inserted into the insect with the other hand. While pinning 1/3rd length of the pin should be above the insect to permit a comfortable finger hold. Exact place of insertion of the pin varies among different groups of insects.

S. No.	Insect groups	Pinning region
1.	Grasshoppers, crickets, preying, mantids and cockroaches	Pronotum
2.	Bugs	Scutellum
3.	Stick insects	Metanotum
4.	Beetles and weevils	Right elytron
5.	Earwigs	Right tegmen
6.	Dragonfly, damselfly, antlion, green, lacewing fly, moths, butterflies, bees, wasps, ants and true flies	Thorax

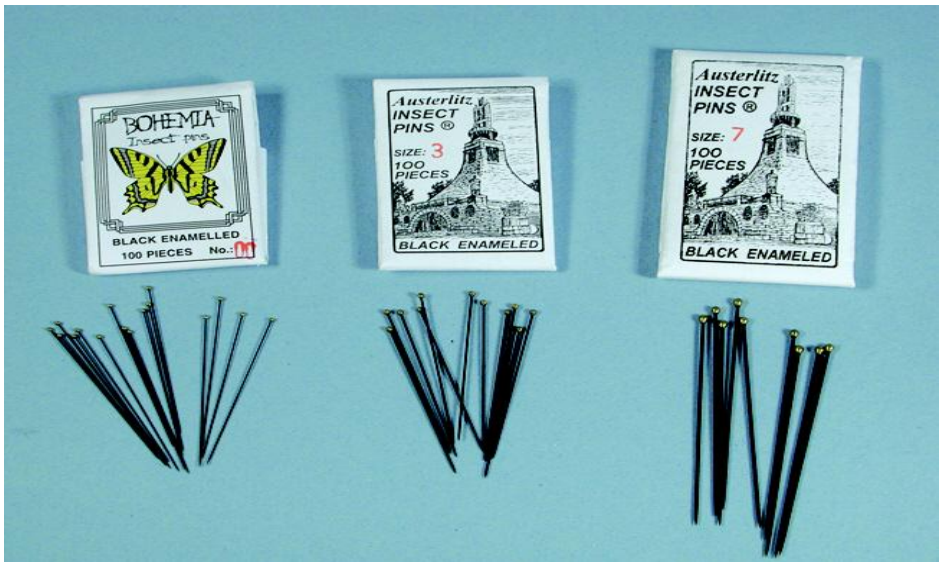

Fig. Types of pins.-- Insect pins (ranging from 00 (thinnest) to 7 thicknest.)

Fig. a.Pinning (Honeybee) b. Bug

2. Double mounting

Pinning is troublesome in smaller insects. Very small insects cannot be pinned because most of the body parts of the insects will be lost during pinning. For such insects double mounting can be followed.

i. Staging: The stage is a narrow rectangular piece of pith or cork. The small insect is pinned correctly with a micro pin to the stage. Later the stage is pinned in the insect store box with a bigger pin.

ii. Carding: A rectangular (5 x 8 mm or 5 x 12 mm) white card or celluloid bit may be used as stage. On the stage instead of pinning, the insect specimen is stuck on it by using transparent or stain free adhesive. A spot of good glue or white gum can also be used. The insect should not be embedded in the glue and only minimum quantity of the glue should be used. After mounting, the card is pinned to the insect storage box with a large pin.

iii. Pointing: The insect specimen is glued to a card or celluloid bit into a triangle of 10 mm height and 5 mm base. Bend down the tip of the card to

form a small surface to which the insect is stuck. Apply a drop of glue or adhesive by touching the point to the glue and to the thorax of the insect to be mounted. Press the right side of the specimen against angled and glued card tip. A bigger pin is inserted at the midpoint near the base for pinning the card with the insect to insect store box.

3. Liquid preservation

Soft-bodied forms (nymphs, larvae and many adults) shrivel when mounted dry. Such insects can be preserved in preservative fluids like ethyl alcohol (70%) and formalin (4%). All these preservatives are highly volatile. Screw cap vials are satisfactory if the caps are tight fitting. Seal the stopper with paraffin wax and properly label.

4. Setting

Setting insects is essential to study the wing characters. It affords a better look to the preserved specimens. Wings of moths, butterflies, dragonflies and damselflies are set on either side. In grasshoppers, wings on one side alone are set. Setting boards are used for setting insects. Setting should be done before the insects become stiff.

Fig. a. Polyphemus Moth a. spread board b. after pinnig

IV. LABELLING

Labels are must for every collection. Any collection should have a locality label giving particulars about date and locality of its capture. An additional label is often used that usually has the name or initials of the collector and the habitat or host from which the specimen is collected. Labels should be small, (12 x 6 mm) neat and made of stiff paper. Labels may be printed or hand written with micro tipped pen. They are inserted beneath the insects at 1/3rd height from the base. The long axis of the label should coincide with the long axis of the insect. If more than one label is used then the label should be parallel. All labels should be oriented so that they read from left side.

Fig. Insect labelling

V. DISPLAY

Insect store boxes: Commonly wooden boxes of dimension 45 x 30 x 15 cm are used as insect store boxes for displaying preserved insects. The box should be light in weight, airtight and moisture proof with a well fitting hinged lid. A cell is provided inside to keep repellents. Cork sheets are glued to the inside of the top and bottom of the box to permit pinning. Glass topped boxes can be used for displaying insect collections but the colour of the preserved insects fades due to constant exposure to light.

Repellents and preservatives: Dermestid beetles, red flour beetle and psocids commonly attack preserved specimens. Naphthalene balls mounted on pins are pinned inside to repel museum insects. This is done by heating the head of a pin in flame and pressing it against a naphthalene ball. Naphthalene flakes can also be kept in perforated envelopes and can

be pinned in the boxes. In the place of naphthalene, para-dichloro-benzene (PDB) crystals can be used.

Riker mount: A Riker mount is a flat container having a glass or transparent cover containing cotton wool and is used for mounting a plant or insect specimen. The name Riker is given after an American botanist. It is useful for displaying various life stages (blown up caterpillar, empty pupal case and adult of lepidopteran insects). Riker mounts can be used as excellent teaching aids.

Fig. a. Insect storage boxes b. The original redwood insect box

4.4 TYPES OF MUSEUM COLLECTIONS

Museum collections are of various types, depending on the objectives of each museum and the purpose for which the collections are intended. It is important to differentiate between these types of collections and to

adhere closely to specific objectives in each case .After collecting insects . We work in different groups of insects Museums:

1. Survey collections

Species are huge insects and confined to a specific geographic area . Such surveys may cover the entire biota . On the other hand, a survey may be designed to cover a particular group . such as the animal fauna of Iraq . Some collections are devoted exclusively to surveying a particular geographic area, *e.g* . such as the animal fauna of Iraq . Such surveys may cover the entire biota, . On the other hand, a survey may be designed to cover a particular group, *e.g.*, the Iraqi Insect survey, or certain economic pests, *e.g.*, survey of leaf beetles , Family Chrysomelidae (Hamma Murad , 204) . Survey collections may involve large numbers of specimens. Since the success of any survey depends on accurate and fairly prompt identification, this is the most important part of the work (Mayer, et al. 1953) .

Fauna : The animal life of a region

2. Identification collections

Is the group present in the large experiment stations and Agriculture quarantine, and reliable in the diagnosis of insect species are scattered in the vicinity of these stations . There are two primary requisites for sucb work :

(1) an adequate library and (2) a representative reference collection. The collection must be a study collection with specimens suitable for detailed comparison. It must approach completeness in representation of the species recorded from the region covered. Long series of duplicates are neither necessary nor desirable.

3. Research collections

Insect groups are more accurate, which aim to collect samples for analysis of appropriate comprehensive taxonomic . They may be private in the hands of an individual; semipublic, in the laboratories of a privately endowed institution such as an academy of science or private museum· or public, in a city, state, or national museum or in public schools o;universities. The methods employed in these various collections are essentially the same, differing only as the size of the collection may introduce special problems.

These collections serve as the focal points for taxonomic research and publication

4. Type collections

A group of original types that described for the first time when they are discovered and is referenced to determine whether it was one of the types that the study match the ideal model or different from him. These types are deposited in major museums .